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APPLICATION NO.	FILING D	DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.	
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FULWIDER PATTON LEE & UTECHT, LLP				EXAMINER		
HOWARD HUGHES CENTER 6060 CENTER DRIVE				KANG, JULIANA K		
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Please find below and/or attached an Office communication concerning this application or proceeding.

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Art Unit: 2874

DETAILED ACTION

Inventorship

1. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

Claim Objections

2. Claim 24 is objected to because of the following informalities: claim 24 recites limitation "said shape memory collar" in line 3. There is insufficient antecedent basis for this limitation in the claim. It appears that claim 24 should be corrected to be dependent on claim 23 instead of claim 20. Claim 24 also recites limitation "said heat shrink material" in line 2. There is insufficient antecedent basis for this limitation in the claim. Appropriate corrections are required.

Specification

3. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: Claim 29 recites the limitation of polishing the proximal end of the optical fiber for connection of the proximal end of the optical fiber to an optical

Art Unit: 2874

fiber ferrule. However, it appears that the claimed limitation is not disclosed in the specification. It is suggested to amend the specification to include the claimed limitation that is recited in claim 29 without adding any new issues or new matters.

Claim Rejections - 35 USC § 103

- 4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:
 - (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.
- 5. Claims 1-6, 8, 13, 15-26, 28, 29 and 31-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hillsman et al (U.S. Patent 5,514,128) and further in view of Lange et al (U.S. Patent 6,077,258).

Regarding claims 1, 20, and 22, Hillsman et al teach a variable stiffness optical fiber shaft comprising an optical fiber having a proximal end (12) and a distal end (20), a tapered reinforcing tube (34, 42, 44, see Fig. 5) bonded to the optical fiber (see claim 12 of Hillsman et al) and a reinforcing coil (68) attached over the optical fiber and over a distal portion of the reinforcing tube (see Fig. 6A). However, Hillsman et al do not disclose a reinforcing braid. Lange et al teach that a metal braid or a coil is used as a support member at a distal end of a catheter shaft for the purpose of longitudinal rigidity, torsional rigidity and flexibility (see column 1 lines 40-49). Since applicant does not disclose the criticality in the use of the braid, it would have been obvious to one with ordinary skill in the art at the time the invention was made to use a braid in Hillsman et

Art Unit: 2874

al's invention as an alternative design choice as taught by Lange et al to provide rigidity and flexibility at the distal end of the shaft.

Regarding claims 2, 15, 16, 21, 31 and 32, Hillsman et al show a radiopaque coil (54) fabricated from 90% platinum that are attached to the distal portion of the optical fiber (Fig. 2A and column 9 lines 1-21).

Regarding claims 3, 17, 23 and 33, Hillsman et al teach a shape memory collar (28, marker). Hillsman et al further teach that the shape memory collar (28) is bonded to the fiber (24) using a suitable adhesive (see column 4 lines 53-59).

Regarding claims 4,18, 19, 24 and 34, Hillsman et al teach a distal sheath (26, jacket) that is connected to the distal end of the optical fiber and extending over a portion of the said shape memory collar (28, marker band) (see Fig. 2A). Hillsman et al teach that the distal sheath (26) can be made of any suitable material such as a polyester copolymer (see column 4 lines 45-49) and further teach using a polyethylene for distal sheath (90) in another embodiment (see column 10 line 66 to column 11 line 1). Thus, it would have been easily recognized by one with ordinary skill in the art to use any suitable material including polyethylene for the distal sheath (26) in Hillsman et al's invention as an alternative design choice. Polyethylene is a known heat shrink material as stated by applicant in page 11 of the present disclosure.

Regarding claims 5 and 25, Hillsman et al show an outer buffer (26) which is removed from a distal portion of the optical fiber (see Fig. 2A).

Regarding claims 6 and 26, Hillsman et al show a connecting hub (18) attached over a proximal portion of the optical fiber (see Figs. 1, 3 and 4).

Art Unit: 2874

Regarding claims 8, 13 and 28, Hillsman et al show a strain relief member (80, 82) attached over the proximal portion of the optical fiber (see column 5 lines 60-63).

Regarding claim 29, as described above, Hillsman et al/Lange et al disclose essentially all the claimed limitations. Although Hillsman et al teach polishing the distal end of the optical fiber to provide an optically smooth surface (see column 10 lines 10-15), Hillsman et al/Lange et al do not teach polishing the proximal end of the optical. Polishing the end surface of an optical fiber provides low insertion loss and less reflected returning light. Also handling an optical fiber in a ferrule is much easier than handling a bare optical fiber and the ferrule also provides additional protection for the optical fiber. Since Hillsman et al's proximal end of the optical fiber is further connected to a light source (see column 4 lines 19-32), it would have been obvious to one with ordinary skill in the art to polish the proximal end of Hillsman et al/Lange et al's optical fiber and to place the optical fiber in a ferrule in order to provide extra protection, and to provide low insertion loss and less reflected returning light between the coupling of the optical fiber and light source. Please note, regarding the rejections above, that method claims parallel article claims without the introduction of any particular manufacturing methods, so it is proper to examine the article and method claims together.

6. Claims 7 and 27, are rejected under 35 U.S.C. 103(a) as being unpatentable over Hillsman et al (U.S. Patent 5,514,128) and Lange et al (U.S. Patent 6,077,258) as applied to the claims 1, 6, 20 and 26 above, and further in view of Drasner et al (U.S. Patent 5,234,406).

Art Unit: 2874

Regarding claims 7 and 27, as described above, Hillsman et al/Lange et al disclose the invention substantially as claimed including the hub. However, Hillsman et al/Lange et al do not disclose that the connecting hub is attached to the optical fiber with adhesive. Drasner et al teach a connection hub that is attached to a shaft by an adhesive for the purpose of a permanent connection (see column 2 lines 59-64). It would have been obvious to one with ordinary skill in the art at the time the invention was made to use an adhesive in Hillsman et al/Lange et al's invention as taught by Drasner et al to attach the connecting hub to the shaft for the purpose of permanent connection.

7. Claims 1, 12-14, 31 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Amplatz et al (U.S. Patent 5,607,419) and further in view of Lange et al.

Regarding claims 1 and 14 and 20, Amplatz et al disclose a variable stiffness optical fiber shaft comprising an optical fiber (34) having a proximal end (12) and a distal end (14), a tapered reinforcing tube (26) with a thickness that varies over the length of the reinforcing tube, and a reinforcing coiled wire (42) attached over the optical fiber and over a distal portion of the reinforcing tube (see Fig. 2). Amplatz et al's coiled wire is made of stainless steel and therefore provides stiffness and torqueability to the shaft. However, Amplatz et al do not disclose a reinforcing braid. Lange et al teach that a metal braid or a coil is used as a support member at a distal end of a catheter shaft for the purpose of longitudinal rigidity, torsional rigidity and flexibility (see column 1 lines 40-49). Since applicant does not disclose the criticality in the use of the braid, it would

Art Unit: 2874

have been obvious to one with ordinary skill in the art at the time the invention was made to use a braid in Amplatz et al's invention as an alternative design choice as taught by Lange et al to provide rigidity and flexibility at the distal end of the shaft.

Regarding claims 12, 31 and 35, Amplatz et al teach a reinforcing coil (30) attached over the optical fiber and under a distal portion of the reinforcing tube (42) (see Fig. 2).

Regarding claim 13, Amplatz et al teach a strain relief member (18) attached over the proximal portion of the optical fiber (see Fig. 1 and column 2 lines 48-50).

Conclusion

- 8. The prior art documents submitted by applicant have been considered and made of record (note the attached copy of form PTO-1449).
- 9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Samson (U.S. Patent 5,505, 725) teaches a shapeable optical fiber (see Fig. 5). Samson et al (U.S. Patent 6,143,013) teach a braided catheter for an exceptionally thin wall, controlled stiffness, and high resistance to kinking (see abstract). Cho et al (U.S. Patent 5,083,549) teach an endoscope with tapered shaft. Ishiyama et al (U.S. Patent 5,743,787) teach a method for polishing an optical fiber end surface. Berg et al (U.S. Patent 5,954,651) teach a catheter having a high tensile strength braid wire at the distal end of the catheter. Giba et al (U.S. Patent 5,876,373) teach a steerable catheter and a super elastic material such as platinum, stainless steel, shape memory (see column 9 line 61 to column 10 line 2).

Art Unit: 2874

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Juliana K. Kang whose telephone number is (703) 305-6259. The examiner can normally be reached on Mondays and Thursday 7:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rod Bovernick can be reached on (703) 308-4819. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7724 for regular communications and (703) 308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-3072.

Juliana Kang

February 4, 2003